

Claims

- [c1] 1. A method for determining when to stop an engine in a vehicle having a second power source, the method comprising:
- comparing at least one engine condition to a corresponding predetermined engine condition, thereby generating a first flag;
 - comparing at least one vehicle system controller condition to a corresponding predetermined vehicle system controller condition, thereby generating a second flag;
 - comparing at least one second power source condition to a corresponding predetermined second power source condition, thereby generating a third flag; and
 - stopping the engine when at least one of the flags indicates an engine stop condition.
- [c2] 2. The method of claim 1, wherein the first flag indicates an engine stop condition when each of the at least one engine conditions matches a corresponding predetermined engine condition, the second flag indicates an engine stop condition when each of the at least one vehicle system controller conditions matches a corresponding predetermined vehicle system controller condition, and

the third flag indicates an engine stop condition when each of the at least one second power source conditions matches a corresponding predetermined second power source condition.

[c3] 3. The method of claim 1, wherein the at least one vehicle system controller condition includes at least one driver-controlled condition chosen from a set of driver-controlled conditions, the set including a driver actuated switch position, an accelerator pedal position, a brake pedal position, and a gear lever position.

[c4] 4. The method of claim 3, wherein the predetermined vehicle system controller conditions include predetermined driver-controlled conditions, the predetermined driver controlled conditions including the driver actuated switch in an enable position, the accelerator pedal in a completely released position, the brake pedal in a depressed position, and the gear lever not in a reverse position.

[c5] 5. The method of claim 1, wherein the at least one vehicle system controller condition includes at least one vehicle condition chosen from a set of vehicle conditions, the set including a current vehicle speed, a maximum vehicle speed, and an engine runtime.

- [c6] 6. The method of claim 5, wherein the predetermined vehicle system controller conditions include predetermined vehicle conditions, the predetermined vehicle conditions including the current vehicle speed being approximately zero, the maximum vehicle speed being at least a predetermined minimum vehicle speed, and the engine runtime being at least a predetermined minimum engine runtime.
- [c7] 7. The method of claim 1, wherein the at least one vehicle system controller condition includes at least one energy management condition chosen from a set of energy management conditions, the set including a second power source state of charge and a required electrical load.
- [c8] 8. The method of claim 7, wherein the predetermined vehicle system controller conditions include predetermined energy management conditions, the predetermined energy management conditions including the state of charge being greater than a predetermined minimum state of charge, and the required electrical load being at or below a predetermined maximum electrical load.
- [c9] 9. The method of claim 1, wherein the vehicle includes a transmission, a motor, and a climate control system, the

method further comprising:

comparing at least one transmission condition to a corresponding predetermined transmission condition,

thereby generating a transmission flag;

comparing at least one motor condition to a corresponding predetermined motor condition, thereby generating a motor flag; and

comparing at least one climate control condition to a corresponding predetermined climate control condition, thereby generating a climate flag.

[c10] 10. The method of claim 9, wherein the engine is stopped only when each of the flags indicates an engine stop condition.

[c11] 11. A method for enabling engine standby in a vehicle having an engine, a motor, and a battery, the method comprising:
determining whether at least one engine condition matches a corresponding predetermined engine condition;
determining whether at least one vehicle system controller condition matches a corresponding predetermined vehicle system controller condition;
determining whether at least one second power source condition matches a corresponding predetermined second power source condition; and

enabling engine standby when at least one of the determined conditions matches a corresponding predetermined condition.

[c12] 12. The method of claim 11, wherein the vehicle includes a transmission and a climate control system, the method further comprising:

determining whether at least one transmission condition matches a corresponding predetermined transmission condition;

determining whether at least one motor condition matches a corresponding predetermined motor condition; and

determining whether at least one climate control condition matches a corresponding predetermined climate control condition.

[c13] 13. The method of claim 12, wherein engine standby is enabled only when each of the determined conditions matches a corresponding predetermined condition.

[c14] 14. The method of claim 11, wherein the at least one vehicle system controller condition includes at least one driver-controlled condition, at least one vehicle condition, and at least one energy management condition; and wherein the predetermined vehicle system controller conditions include predetermined driver-controlled con-

ditions, predetermined vehicle conditions, and predetermined energy management conditions.

[c15] 15. The method of claim 14, wherein the at least one driver-controlled condition is chosen from a set of driver-controlled conditions, the set including a driver actuated switch position, an accelerator pedal position, a brake pedal position, and a gear lever position; the at least one vehicle condition is chosen from a set of vehicle conditions, the set including a current vehicle speed, a maximum vehicle speed, and an engine runtime; and the at least one energy management condition is chosen from a set of energy management conditions, the set including a battery state of charge and a required electrical load.

[c16] 16. The method of claim 15, wherein the predetermined driver-controlled conditions include the driver actuated switch in an enable position, the accelerator pedal in a completely released position, the brake pedal in a depressed position, and the gear lever not in a reverse position; the predetermined vehicle conditions include the current vehicle speed being approximately zero, the maximum vehicle speed being at least a predetermined minimum vehicle speed, and the engine runtime being at least a

predetermined minimum engine runtime; and the predetermined energy management conditions include the battery state of charge being greater than a predetermined minimum state of charge, and the required electrical load being at or below a predetermined maximum electrical load.

[c17] 17. A system for enabling engine standby in a vehicle having an engine and a second power source, the system comprising:

at least one controller configured to compare at least one condition of a set of conditions to a corresponding predetermined condition to generate a controller flag and to enable engine standby when at least the controller flag indicates an engine standby enable condition.

[c18] 18. The system of claim 17, wherein the controller includes an engine controller, and the at least one condition includes an engine fault condition.

[c19] 19. The system of claim 17, wherein the controller includes a vehicle system controller, and the set of conditions includes a driver actuated switch position, an accelerator pedal position, a brake pedal position, a gear lever position, a current vehicle speed, a maximum vehicle speed, an engine runtime, a second power source state of charge, and a required electrical load.

[c20] 20. The system of claim 17, wherein the vehicle includes a plurality of subsystems, the system further comprising additional controllers for controlling the subsystems, each additional controller being configured to send subsystem information to the at least one controller, the at least one controller being further configured to generate additional flags related to each of the subsystems, and to enable engine standby when at least one of the additional flags indicate an engine standby enable condition.